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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,620

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Yao-chun Shen

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EXAMINER

SAHU, MEENAKSHI S

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,620	Applicant(s) SHEN ET AL.	
	Examiner MEENAKSHI S. SAHU	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/30/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 5, 9 to 14, 16, 22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Brener et al. (US 5,894,125).

Regarding claims 1 and 2, Brener et al. disclose a terahertz radiation source [abstract] comprising: an emitter comprising a semiconductor material having two sides [element 22 in Fig 2, column 4 lines 32 to 34]; a pair of electrodes on one side of said semiconductor [elements 23 and 24 in Fig 2, column 5 lines 52 to 53]; a pulsed light source input for illuminating said semiconductor to excite photocarriers in said semiconductor to generate terahertz radiation [element 26 in Fig 2, column 4 lines 60 to 62]; and a radiation collector to collect said terahertz radiation [sample holder and sample, elements 29 and 28 respectively in Fig 2, column 5 lines 10 to 12; and wherein said radiation collector is disposed on the same side of said semiconductor as said electrodes [elements 28 and 29 are on the same side of the semiconductor as electrodes 23 and 24 in Fig 2].

Regarding claim 5, Brener et al. disclose that the radiation collector has an aperture for illuminating said semiconductor through said radiation collector [element 27 in Fig 2, column 5 lines 8 to 13].

Regarding claim 9, Brener et al. disclose a pulsed laser to provide light to said pulsed light source input [element 26 in Fig 2, column 4 lines 60 to 62].

Regarding claim 10, Brener et al. disclose a source of terahertz radiation comprising : a housing, said housing holding a semiconductor, said semiconductor bearing a pair of electrodes adjacent one surface of said semiconductor; means for directing a pulsed laser onto said semiconductor to generate terahertz radiation; and means for providing said terahertz radiation from said source; and characterized in that said providing means is disposed to face said electrode-bearing semiconductor surface [Fig 2].

Regarding claims 11 to 14, Brener et al. disclose using a collimating (focusing) lens [column 3 lines 60 to 63] and means for providing an aperture through which the pulsed laser can be directed onto the semiconductor [Fig 2].

Regarding claim 16, Brener et al. disclose a source of terahertz radiation for providing terahertz radiation within a portion of a frequency range of from 0.1THz to 100THz, more particularly within a portion of a frequency range of from 0.1THz to 30THz [claim 10].

Regarding claims 22 and 23, Brener et al. disclose a method of providing terahertz radiation from a photoconductive terahertz radiation source, the source comprising a semiconductor with electrodes adjacent a surface of the said semiconductor, the method comprising: applying an electric field to said electrodes; and directing a pulsed laser beam towards said semiconductor surface, wherein a normal to said semiconductor surface with a component in a direction of propagation of said laser beam defines a forward direction ; and wherein the method further comprises: collecting said terahertz radiation in a reverse direction, substantially opposite to said forwards

directions [Fig 2 and column 5 line 2 to column 6 line 11].

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 4, 6 to 8, 15, 17 to 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Brener et al. (US 5,894,125).

Regarding claims 3 and 4, Brener et al. disclose a terahertz radiation source but fail to explicitly disclose a mirror or a lens as a radiation collector. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a mirror or lens since it was known in the art that mirrors and lenses are radiation collectors.

Regarding claims 6 to 8 and 15, Brener et al. disclose a terahertz radiation source but fail to explicitly disclose using a diagonal mirror between the semiconductor and radiation collector and a cooling device in contact with the emitter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a diagonal mirror and cooling device since it was known in the art that mirrors can be used to change the optical paths and the emitters can warm up and need cooling mechanisms to function properly.

Regarding claims 17 to 19, Brener et al. disclose a terahertz emitter with a semiconductor and electrodes [Fig 2] but fail to explicitly disclose using a heat transfer device mounted adjacent to the semiconductor where the heat transfer device is an active cooling device or a Peltier effect cooling device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use cooling devices since it was known in the art that the emitters can warm up and need cooling mechanisms to function properly. Active cooling devices and Peltier cooling devices are well known in the art for such purposes.

Regarding claims 20 and 21, Brener et al. disclose using a compound semiconductor or a semiconductor comprising gallium arsenide [column 4 lines 33 to 42].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEENAKSHI S. SAHU whose telephone number is (571)270-3101. The examiner can normally be reached on Monday - Friday 8AM - 5PM est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jack I. Berman/
Primary Examiner, Art Unit 2881

/Meenakshi S Sahu/
Examiner, Art Unit 2881